Mojave Fringe-Toed Lizard (*Uma scoparia*)

Legal Status

State: California Species of Concern
Federal: Bureau of Land Management Sensitive
Critical Habitat: N/A
Recovery Planning: N/A
Notes: In 2006, a petition was filed to list the northern populations associated with the Amargosa River as a distinct population segment (DPS) under the Endangered Species Act. On October 4, 2011, the U.S. Fish and Wildlife Service (USFWS) published its 12-month finding, concluding that the Amargosa River population does not constitute a DPS and is not a listable entity (76 FR 61321–61330).

Taxonomy

The Mojave fringe-toed lizard (*Uma scoparia*) is a member of the *Phrynosomatidae* family of lizards that currently has 10 recognized genera occurring from southern Canada to western Panama (Reeder and Wiens 1996). The Integrated Taxonomic Information System (2011) currently recognizes six species of fringe-toed lizard in North America: the Mojave (*Uma scoparia*), the Yuma Desert (*U. rufopunctata*), the Chihuahuan Desert (*U. paraphygas*), the Colorado Desert (*U. notata*), the Coachella Valley (*U. inornata*), and the Coahuila Desert (*U. exsul*) fringe-toed lizard. The Amargosa River population has been identified as a potential DPS, although DNA sequencing found no evidence to support this (76 FR 61321–61330). Descriptions of the species' physical characteristics can be found in Stebbins (1954).

Distribution

General

The Mojave fringe-toed lizard is restricted to deposits of loose sand; as a result, its distribution is discontinuous throughout its range

(Fromer et al. 1983). The species is endemic to the Mojave and Sonoran deserts of Southern California and western Arizona. Within these regions, they are known to occur at more than 35 sand dune complexes in California and one in Arizona (Jarvis 2009). Figure SP-R6 depicts the range of this species in relation to the Desert Renewable Energy Conservation Plan (DRECP) Area.

Distribution and Occurrences within the Plan Area

Historical

Historically, this species was known to occur throughout the windblown sand areas in the following counties within the Plan Area: southern Inyo, San Bernardino, northern Los Angeles, and eastern Riverside. Within these counties, this species was known to occur within the present and historical river drainages and associated sand fields of the Mojave, Amargosa, and Colorado Rivers (Jarvis 2009). Outside of the Plan Area, they were known from La Paz County Arizona (Jones and Lovich 2009). Norris (1958) indicates that many of the major dune complexes are the result of reworking previous pluvial beach sands, and that fringing dunes adjacent to river systems may have been more continuous than the time of writing. Most date from the recent, while several others date from the Pleistocene. There are 18 historical (i.e., pre-1990) occurrences for Mojave fringe-toed lizard contained in the California Natural Diversity Database (CNDDB) and an additional 30 records with an unknown date of observation (CDFW 2013; Dudek 2013). These records are widely scattered throughout the Plan Area, generally in a region bounded on the west by the Palmdale area, on the northeast by the Black Mountains, on the east by the Turtle Mountains, and on the south by the Ford-Palen dunes area (Figure SP-R6).

Recent

There are 115 recent (i.e., since 1990) occurrences recorded in the Plan Area (Dudek 2013). Since 2006, Mojave fringe-toed lizards have been found in locations within the Amargosa River drainage that did not have any historic occurrence records. As described above, this species is currently found within more than 35 named and unnamed sand dune complexes within the three major river drainages in the

Plan Area: the Amargosa, Mojave, and Colorado rivers. Norris (1958) described 31 dune complexes. However, a more recent paper by Murphy et al. (2006) documents the extirpation of the species at four sites where they were previously reported (i.e., Harper and El Mirage dry lakes, Piute Butte, and Lovejoy Buttes). The named dune complexes are listed as follows with their associated river complex (76 FR 61321–61330).

Amargosa River

1. Ibex Dunes
2. Little Dumont Dunes
3. Dumont Dunes
4. Coyote Holes
5. Valjean Dunes

Mojave River

6. Hodge
7. Lenwood
8. Daggett
9. Yermo
10. Newberry Springs
11. Coyote Lake
12. Alvord Mountain
13. Cronese Lakes
14. Bitter Spring
15. Red Pass Dune
16. Silver Lake
17. Afton Canyon
18. Crucero
19. Rasor Road
20. Sands Siding

21. Devil's Playground – Kelso Dunes
22. Troy Dry Lake
23. Pisgah
24. Ludlow

Mojave and Colorado Rivers

25. Amboy Crater/Lava Field
26. Bristol Dry Lake
27. Cadiz Dry Lake
28. Dale Dry Lake East/West
29. Pinto Basin
30. Palen Dry Lake
31. Ford Dry Lake
32. Rice Valley.

Natural History

Habitat Requirements

The Mojave fringe-toed lizard is only found in and immediately around areas of the Mojave Desert that contain deposits of eolian, or fine windblown sands (Jones and Lovich 2009). These sands are typically associated with dunes, washes, hillsides, margins of dry lakes, and sandy hummocks between elevations of 90 and 910 meters (295 and 2,986 feet) (76 FR 61321–61330; Norris 1958; Stebbins 2003). Sand dune ecosystems, including their source sand and sand corridors, are necessary for the long-term survivorship of eolian sand specialists (Barrows 1996). Though sparsely vegetated, vegetation may include palo verde (*Parkinsonia florida*), mesquite (*Prosopis grandulosa*), creosote bush (*Larrea tridentata*), white bur sage (*Ambrosia dumosa*), indigo bush (*Dalea* sp.), sandpaper plant (*Petalonyx thurberi*), saltbush (*Atriplex* sp.), and numerous species of annuals (76 FR 61321–61330; Jarvis 2009).

Table 1. Habitat Associations for Mojave Fringe-Toed Lizard

Land Cover Type	Land Cover Use	Habitat Designation	Habitat Parameters	Supporting Information
Windblown sands associated with creosote bush scrub generally associated with dune complexes, dry lake margins, and the base of hillsides	Dispersal, refugia, breeding	Dispersal, breeding	Windblown sands	Jones and Lovich 2009

Foraging Requirements

The Mojave fringe-toed lizard is best described as an opportunistic omnivore. They feed primarily on sand-dwelling insects, but will also feed on the flowers, leaves, and seeds of annual plants (Jarvis 2009). Juvenile Mojave fringe-toed lizards feed primarily on arthropods including ants, beetles, and scorpions. As they become adults, their diet shifts to include a more herbivorous diet (Jones and Lovich 2009). As is seen in many reptiles that live in arid environments, these lizards obtain most of their water from the insects and plants that they ingest (76 FR 61321–61330).

Reproduction

Sexual maturity is reached when individuals reach 65 to 70 millimeters (2.5 to 2.75 inches, snout-vent length, usually two summers after hatching [Jennings and Hayes 1994]). Mating typically occurs between April and late June (Table 2; 76 FR 61321–61330). Reproductive activity is highly dependent on the availability of sand-dwelling plants that grow in response to winter (October–March) rainfall (76 FR 61321–61330). Clutch size ranges from two to five eggs, but average two or three eggs (Miller and Stebbins 1964). During years with low rainfall females produce smaller clutch sizes, or none at all. Conversely, they may have multiple clutches in years with abundant rainfall (76 FR 61321–61330).

Table 2. Key Seasonal Periods for Mojave Fringe-Toed Lizard

	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec
Breeding				X	X	X						
Active			X	X	X	X	X	X	X	X		
Hibernation	X	X									X	X

Source: 76 FR 61321–61330.

Spatial Activity

Mojave fringe-toed lizards are most active from late spring through early fall, when they are active during the hotter periods of the day. According to Jones and Lovich (2009), their optimum body temperature is 37.3 degrees Celsius (99 degrees Fahrenheit), and they are rarely active when air temperatures are below 38 degrees Celsius (100 degrees Fahrenheit) or above 49 degrees Celsius (120 degrees Fahrenheit). They seek refuge in burrows or under the sand when daytime surface temperatures start to exceed 49 degrees Celsius (120 degrees Fahrenheit).

Home ranges for Mojave fringe-toed lizards vary greatly between sexes with adult males typically holding large (0.10 hectare or 0.3 acre) home ranges that are on average three times that of females. Both sexes display territorial behavior, although only males are known to defend their home ranges aggressively (Jones and Lovich 2009).

Dispersal of Mojave fringe-toed lizards is unlikely in the absence of nearby areas of windblown sands (76 FR 61321–61330). Within areas of active sand transport, sand dunes are highly dynamic and continually moving; in some cases, moving several meters per year. Movement between populations is poorly studied, although is likely limited by the natural movement of sands (Table 3). No specimen of Mojave fringe-toed lizard has been captured more than approximately 150 feet from windblown sand deposits (76 FR 61321–61330).

Table 3. Movement Distances for Mojave Fringe-Toed Lizard

Type	Distance/Area	Location of Study	Citation
Home Range Adult Male	0.10 hectare (0.3 acre)	Mojave	Kaufman n 1982
Home Range Subadult Male	0.02 hectare (0.05 acre)	Mojave	Kaufman n 1982
Home Range Female	0.034 hectare (0.084 acre)	Mojave	Kaufman n 1982

Ecological Relationships

Natural known predators of Mojave fringe-toed lizard include snakes, long-nosed leopard lizard (*Gambelia wislizenii*), greater roadrunner (*Geococcyx californianus*), burrowing owl (*Athene cunicularia*), loggerhead shrike (*Lanius ludovicianus*), hawks, American badger (*Taxidea taxus*), and coyote (*Canus latrans*) (Jones and Lovich 2009). Mojave fringe-toed lizard often uses burrows to escape predation. Burrowing rodents common in their habitat areas are round-tailed ground squirrel (*Spermophilus tereticaudus*), white-tailed antelope squirrel (*Ammospermophilus leucurus*), and various species of kangaroo rat (*Dipodomys* spp.) and pocket mouse (*Perognathus* spp.) (Fromer et al. 1983). In addition to predator avoidance, Mojave fringe-toed lizard use these rodent burrows for thermal protection during very high ambient temperatures.

Lizard species known to occur in habitats with similar characteristics as those preferred by the Mojave fringe-toed lizard include desert iguana (*Dipsosaurus dorsalis*), desert horned lizard (*Phrynosoma platyrhinos*), long-nosed leopard lizard, side-blotched lizard (*Uta stansburiana*), ornate tree lizard (*Urosaurus ornatus*), and zebra-tailed lizard (*Callisaurus draconoides*). Of these species, only zebra-tailed lizard appears to be a potential competitor of the Mojave fringed-toed lizard for food resources with Mojave fringe-toed lizard. These species are both insectivorous, approximately the same adult size, and likely select prey of similar size. Foraging behavior in the two species is similar, although not well documented (Fromer et al. 1983).

Population Status and Trends

Global: Vulnerable (NatureServe 2011)
State: Same as above
Within Plan Area: Same as above

The Mojave fringe-toed lizard is known to occur at more than 35 sand dune complexes in California and one in Arizona, all of which are naturally occurring within the species' historical range (76 FR 61321–61330; Norris 1958). Hollingsworth and Beaman (2001) state that although there is no published data suggesting a decline in population sizes of the Mojave fringe-toed lizard, enough urban development in the Mojave exists to cause concern that populations will be adversely affected. Bureau of Land Management (2002) states that there is no information about population trends. However, a more recent paper by Murphy et al. (2006) documents the extirpation of the species at four sites where they were previously reported (i.e., Harper and El Mirage dry lakes, Piute Butte, and Lovejoy Buttes).

Threats and Environmental Stressors

The loose windblown sand habitat that Mojave fringe-toed lizards rely on requires protection from direct and indirect disturbances (Barrows 1996). Direct disturbances to loose windblown sand habitat can include the use of off-road vehicles, the infestation and stabilization of dune sands by invasive exotic species (e.g., Sahara mustard [*Brassica tournefortii]*), and urban development. Direct disturbances to Mojave fringe-toed lizards include increases in local predators (e.g., common raven). Indirect disturbances to loose windblown sand habitat can include development of sand source areas, sand transport areas, and the use of sand barriers (e.g., sand fences) to control sand movement. It has been stated that this species is highly vulnerable to off-road vehicle activity and the establishment of windbreaks that affect how windblown sand is deposited (Stebbins 2003). The decline of the closely related Coachella Valley fringe-toed lizard is primarily attributed to habitat loss caused by urban development; disruption of the natural movement of sand caused by roads, windbreaks, and other man-made alterations; and off-highway vehicle use, which causes direct impacts to the species' habitat (Weaver 1981; Beatley 1994).

Conservation and Management Activities

Detailed research on the closely related Coachella Valley fringe-toed lizard conducted by Barrows (2006) suggested that the preservation of sand source corridors is critical for the long-term persistence of the species. The current management decisions being made in Coachella Valley should be used in informing management decisions and activities for the Mojave fringe-toed lizard.

Data Characterization

Although records from the California Natural Diversity Database (CDFW 2013) include 92 reports of the Mojave fringe-toed lizard within the Plan Area, there is surprisingly little information available on the current extent and population status of the species. The exception is the paper by Murphy et al. (2006) documenting the presence of the Mojave fringe-toed lizard at 21 sites (including one in Arizona) and the extirpation of the species at four sites. However, significant data are available for the Coachella Valley fringe-toed lizard (e.g., CVCC 2007). Regardless, there appears to be little data available about the effects of various stressors, including off-road vehicles, increased predator abundance, and invasive plant species, on the Mojave fringe-toed lizard.

Management and Monitoring Considerations

Management for the Mojave fringe-toed lizard includes not only the protection of occupied and potential habitat, but also the sources of transport avenues for the requisite sand. In discussing management for the closely related Coachella Valley fringe-toed lizard, the Coachella Valley Multiple Species Habitat Conservation Plan (CVCC 2007) indicates taking the following actions:

a. Control and manage impacts that degrade Coachella Valley fringe-toed lizard habitat, including fragmentation by roads, OHV use in protected habitat (except on designated routes of travel, if any), and other human disturbance.

b. Control human access to occupied habitat as necessary.

c. Evaluate the need as determined by monitoring for perimeter fencing to keep lizards inside conservation areas and away from roadways.

d. Identify actions to reduce impacts from, and control where feasible, invasive species if it is determined from monitoring results that there are impacts to Coachella Valley fringe-toed lizard habitat or populations.

e. Include measures to reduce the impacts to the lizards' food source, harvester ants, including aerial pesticide spraying (in coordination with the California Department of Department of Food and Agriculture) or introduction of exotic species (e.g., fire ants).

Species Modeled Habitat Distribution

This section provides the results of habitat modeling for Mojave fringe-toed lizard, using available spatial information and occurrence information, as appropriate. For this reason, the term "modeled suitable habitat" is used in this section to distinguish modeled habitat from the habitat information provided in Habitat Requirements, which may include additional habitat and/or microhabitat factors that are important for species occupation, but for which information is not available for habitat modeling.

There are 278,723 acres of modeled suitable habitat for Mojave fringe-toed lizard in the Plan Area. Appendix C includes a figure showing the modeled suitable habitat in the Plan Area.

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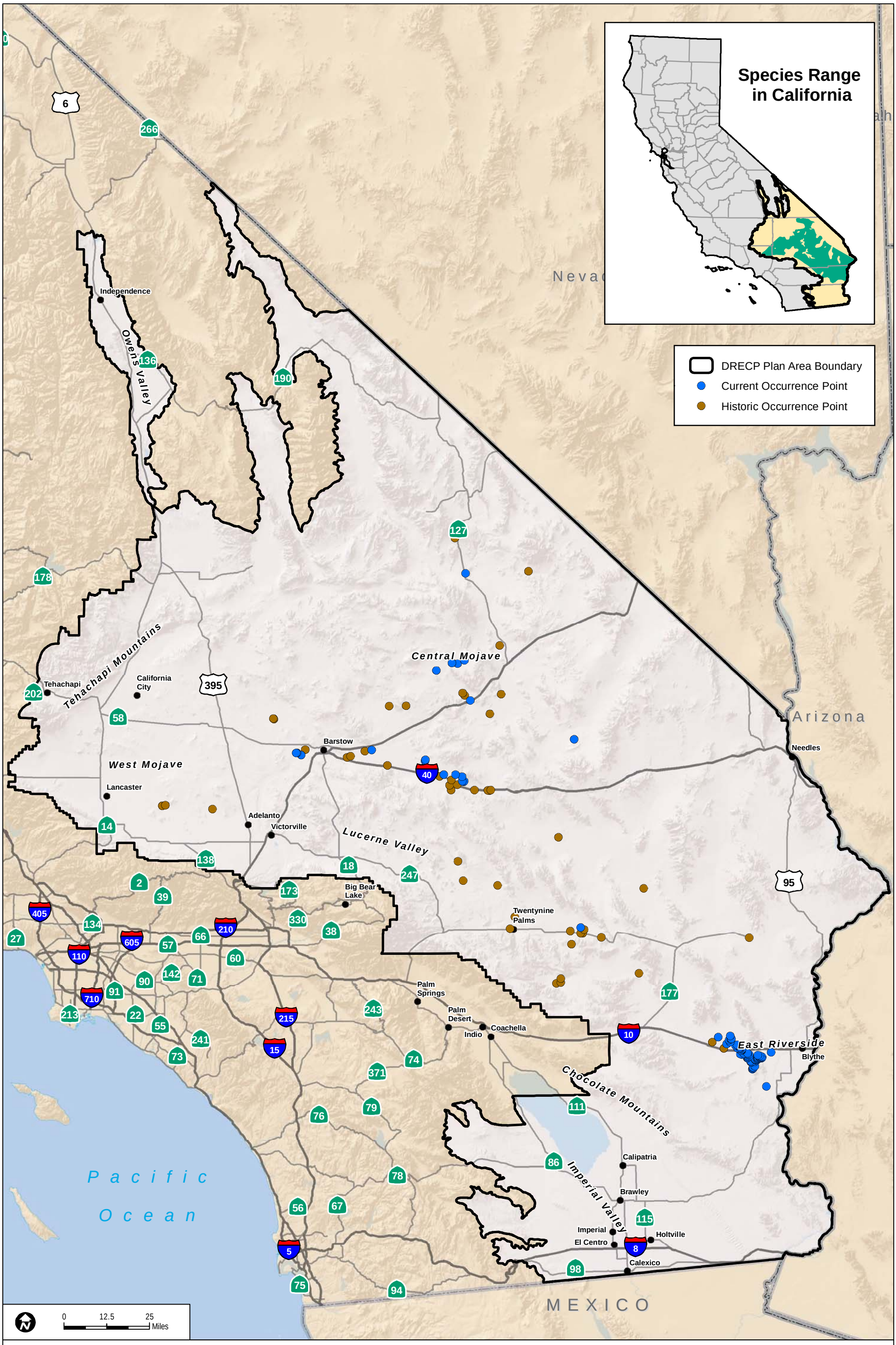

Sources: ESRI (2014); DRECP Species Occurrence Database (2013), CWHR (2008)

FIGURE SP-R03

Mojave Fringe-toed Lizard Occurrences in the Plan Area